This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

   No less than 2 units from the number 9.

   The solution is $(-\infty, 7] \cup [11, \infty)$, which is option D.

   A. $(7, 11)$

   This describes the values less than 2 from 9

   B. $[7, 11]$

   This describes the values no more than 2 from 9

   C. $(-\infty, 7) \cup (11, \infty)$

   This describes the values more than 2 from 9

   D. $(-\infty, 7] \cup [11, \infty)$

   This describes the values no less than 2 from 9

   E. None of the above

   You likely thought the values in the interval were not correct.

   General Comment: When thinking about this language, it helps to draw a number line and try points.

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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$4x + 5 \leq 5x - 8$$

   The solution is $[13.0, \infty)$, which is option A.

   A. $[a, \infty)$, where $a \in [12, 14]$

   * $[13.0, \infty)$, which is the correct option.

   B. $[a, \infty)$, where $a \in [-16, -12]$

   $[-13.0, \infty)$, which corresponds to negating the endpoint of the solution.

   C. $(-\infty, a]$, where $a \in [-15, -12]$

   $(-\infty, -13.0]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

   D. $(-\infty, a]$, where $a \in [6, 15]$

   $(-\infty, 13.0]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 - 6x < \frac{-46x + 8}{8} \leq -7 - 8x$$

The solution is $(-20.00, -3.56]$, which is option D.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [-25.5, -17.25]$ and $b \in [-5.25, -1.5]$

$(-\infty, -20.00) \cup [-3.56, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

B. $[a, b)$, where $a \in [-21, -15.75]$ and $b \in [-4.5, 0.75]$

$[-20.00, -3.56)$, which corresponds to flipping the inequality.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [-21, -18]$ and $b \in [-6, -3]$

$(-\infty, -20.00] \cup (-3.56, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

D. $(a, b]$, where $a \in [-21.75, -16.5]$ and $b \in [-6.75, -0.75]$

* $(-20.00, -3.56]$, which is the correct option.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-6 + 8x \leq \frac{26x - 9}{3} < 4 + 4x$$

The solution is $[-4.50, 1.50)$, which is option C.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [-9.75, -1.5]$ and $b \in [-0.75, 5.25]$

$(-\infty, -4.50) \cup [1.50, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $(a, b]$, where $a \in [-5.25, -0.75]$ and $b \in [-0.75, 9.75]$

$(-4.50, 1.50]$, which corresponds to flipping the inequality.

C. $[a, b)$, where $a \in [-5.25, -2.25]$ and $b \in [0.22, 1.72]$

$[-4.50, 1.50)$, which is the correct option.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-7.5, -3]$ and $b \in [1.05, 1.8]$

$(-\infty, -4.50] \cup (1.50, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{9}{8} + \frac{4}{7}x \leq \frac{7}{3}x - \frac{3}{4}$$

The solution is $[1.064, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [0, 2.25]$

* $[1.064, \infty)$, which is the correct option.

B. $[a, \infty)$, where $a \in [-4.5, 0]$

$[-1.064, \infty)$, which corresponds to negating the endpoint of the solution.

C. $(-\infty, a]$, where $a \in [-4.5, 0.75]$

$(-\infty, -1.064]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

D. $(-\infty, a]$, where $a \in [0.75, 2.25]$

$(-\infty, 1.064]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 + 3x > 5x \text{ or } 7 + 5x < 8x$$

The solution is $(-\infty, -3.5)$ or $(2.333, \infty)$, which is option B.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.65, -2.4]$ and $b \in [1.95, 2.48]$

Corresponds to including the endpoints (when they should be excluded).

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.96, -3.48]$ and $b \in [1.74, 3.01]$

* Correct option.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-2.75, -2.24]$ and $b \in [3.05, 4.35]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3, -1.12]$ and $b \in [3.15, 5.77]$

Corresponds to including the endpoints AND negating.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-8}{7} - \frac{5}{8}x \leq \frac{5}{6}x + \frac{8}{9}$$

The solution is $[-1.393, \infty)$, which is option C.

A. $(-\infty, a]$, where $a \in [0, 4.5]$

$(-\infty, 1.393]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

B. $[a, \infty)$, where $a \in [0.75, 2.25]$

$[1.393, \infty)$, which corresponds to negating the endpoint of the solution.

C. $[a, \infty)$, where $a \in [-2.25, 0.75]$

* $[-1.393, \infty)$, which is the correct option.

D. $(-\infty, a]$, where $a \in [-2.25, 0.75]$

$(-\infty, -1.393]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 - 3x > 4x \text{ or } 6 + 9x < 10x$$

The solution is $(-\infty, -1.0)$ or $(6.0, \infty)$, which is option B.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-8.25, -4.5]$ and $b \in [-0.75, 3.75]$

Corresponds to inverting the inequality and negating the solution.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.75, 0]$ and $b \in [1.5, 8.25]$

* Correct option.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-9.75, -3]$ and $b \in [0, 4.5]$

Corresponds to including the endpoints AND negating.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5.25, 2.25]$ and $b \in [3.75, 9]$

Corresponds to including the endpoints (when they should be excluded).

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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9. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No more than 5 units from the number 4.

The solution is $[-1, 9]$, which is option A.

A. $[-1, 9]$

   This describes the values no more than 5 from 4

B. $(-1, 9)$

   This describes the values less than 5 from 4

C. $(-\infty, -1) \cup (9, \infty)$

   This describes the values more than 5 from 4

D. $(-\infty, -1] \cup [9, \infty)$

   This describes the values no less than 5 from 4

E. None of the above

   You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-8x - 3 \leq 5x + 4$$

The solution is $[-0.538, \infty)$, which is option B.

A. $[a, \infty)$, where $a \in [0.06, 1.26]$

   $[0.538, \infty)$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [-1.23, -0.26]$

   * $[-0.538, \infty)$, which is the correct option.

C. $(-\infty, a]$, where $a \in [-1.54, 0.46]$

   $(-\infty, -0.538]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. $(-\infty, a]$, where $a \in [-0.46, 5.54]$

   $(-\infty, 0.538]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

   You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.
